REMARKS

By the present amendment, claims 1-54 and 132-144 have been cancelled, without prejudice to the applicants' right to pursue these claims via one or more divisional applications stemming from the present application. Accordingly, claims 55-131 are presently pending. Rejoinder of claims 76-114 and 117-131, which presently stand withdrawn from consideration, is respectfully requested pursuant to 37 C.F.R. § 1.141, as discussed in greater detail below. Accordingly, favorable reconsideration and allowance of claims 55-131 is respectfully requested.

In addition, the disclosure has been amended to correct a minor editorial error at paragraph [0209]; support for this amendment may be found at paragraph [0220], for example. The Title of the Invention has also been amended in response to the Examiner's suggestion.

Applicants wish to thank the Examiner for the careful review of the present application and of the prior art.

Election / Restrictions

This item is discussed below, following a discussion of 35 U.S.C. §§ 102 and 103.

Title of the Invention

The Examiner has expressed the view that the title of the invention is not descriptive. The Examiner has stated that a new title is required that is clearly indicative of the invention to which the claims are directed.

By the present amendment, the Title of the Invention has been amended to incorporate some of the wording suggested by the Examiner, and now recites, "Apparatus and Methods for Producing Electromagnetic Radiation". This

amended title corresponds directly to the preambles of independent claims 55 and 115, which recite an "Apparatus for producing electromagnetic radiation", and independent claim 116, which recites a "Method of producing electromagnetic radiation". Therefore, the amended title is clearly indicative of the invention to which the pending claims are directed. Applicants therefore respectfully submit that this ground of objection has been overcome.

35 U.S.C. § 102(b)

The Examiner has rejected claims 55-63, 66, 69, 75, 115 and 116 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,027,185 to Nodwell et al. ("Nodwell").

Applicants respectfully note in passing that the Nodwell reference shares overlapping inventorship with the present application.

Applicants respectfully submit that the Nodwell reference fails to satisfy the requirements for a finding of anticipation of independent claim 55. In this regard, the standard for an anticipation rejection under 35 U.S.C. §102 has been well established by the Court of Appeals for the Federal Circuit, and is summarized in M.P.E.P. § 2131. "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). ... "The identical invention must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). The elements must be arranged as required by the claim, but this is not an *ipsissimis verbis* test, i.e., identity of terminology is not required. *In re Bond*, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990).

Independent claim 55 recites:

55. An apparatus for producing electromagnetic radiation, the apparatus comprising:

a) an electrically insulated flow generator configured to generate a flow of liquid along an inside surface of an envelope; and

b) first and second electrodes configured to generate an electrical arc within the envelope to produce the electromagnetic radiation.

Advantages of providing "an electrically insulated flow generator configured to generate a flow of liquid along an inside surface of an envelope" are discussed throughout Applicants' specification (see e.g. paras. [0027] and [0061]). These advantages include, among other advantages, an ability to reduce the minimum spacing between adjacent lamps in a multi-lamp system.

Nodwell discloses a high intensity radiation source. In the primary embodiment shown in Figure 2, an arc chamber 22 has a cathode structure 23 mounted at one end and an anode structure 24 mounted at the other end, to provide spaced coaxial electrodes between which an arc is maintained. The cathode structure 23 appears to be made of conductive material such as copper except for a cathode surface 26 made of thoriated tungsten. The anode structure 24 includes a hollow electrode 35 which has a cone shaped anode surface 36 and is made of conductive material such as copper. The anode structure 24 includes an annular chamber 39 into which liquid coolant is introduced under pressure through an inlet 40. The liquid coolant forms a vortex which is fast enough to take the form of a hollow cylinder 42 lining the inside of the arc chamber 22. (Nodwell, Col. 4, lines 5-15, 18-19, 40-45, 50-54.)

However, Nodwell fails to disclose, "an electrically insulated flow generator configured to generate a flow of liquid along an inside surface of an envelope", as recited in claim 55.

In this regard, the only discussion of electrical insulation in Nodwell appears to be at col. 5, lines 4-27, which states:

> "In order to increase the life of the anode surface 36, an annular arc constriction 45 is mounted in front of the anode 35 to form a gas expansion chamber 46 between it and the anode surface 36. The constriction 45 determines the diameter of the arc column at the end of the arc chamber 22; and the chamber 46 formed, causes the gas to expand as it enters, losing its vortex motion resulting in a non-vortex stabilized arc at the anode surface 36. The constriction 45 which is also made of copper having a thoriated-tungsten interior surface 47, is preferably electrically insulated from the anode 35 but need not be insulated if the interior surface 47 is short enough in length."

However, this reference to electrically insulating the arc construction 45 from the electrode 35 does not relate to any structure of Nodwell that could be considered to form part of a "flow generator configured to generate a flow of liquid along an inside surface of an envelope", as recited in claim 55. In this regard, it is clear from the above-noted passage of Nodwell and from the depiction of the arc constriction 45 in Figure 2, that the arc constriction 45 merely serves to determine the diameter of the arc column at the end of the arc chamber, and has nothing to do with the generation of the vortexing liquid cylinder 42 formed on the inside of the arc chamber 22. Thus, even though the arc constriction 45 may be electrically insulated from the electrode, the arc constriction is not a "flow generator configured to generate a flow of liquid along an inside surface of an envelope", as recited in claim 55.

Rather, the vortexing liquid cylinder 42 in Nodwell is formed by the annular chamber 39 and the inlet 40 shown in Figure 2, into which the liquid coolant is introduced under pressure (Nodwell, col. 4, lines 50-54). Nodwell fails to disclose that the annular chamber 39 or the inlet 40 are electrically insulated. Thus, the only components of Nodwell that may fairly be compared to the

"flow generator ..." recited in claim 55 are not "electrically insulated", as recited in claim 55.

In summary, therefore, the arc constriction 45 in Nodwell, which is electrically insulated from the electrode 35, is not a "flow generator configured to generate a flow of liquid along an inside surface of an envelope", as recited in claim 55. Thus, the arc constriction 45 of Nodwell is not an "electrically insulated flow generator configured to generate a flow of liquid along an inside surface of an envelope", as recited in claim 55. Conversely, the components of the Nodwell device that are used to generate the vortexing liquid cylinder 42, namely, the annular chamber 39 and the inlet 40, are not electrically insulated. Therefore, the annular chamber 39 and the inlet 40 do not constitute an "electrically insulated flow generator configured to generate a flow of liquid along an inside surface of an envelope", as recited in claim 55.

Accordingly, Nodwell fails to disclose, "an electrically insulated flow generator configured to generate a flow of liquid along an inside surface of an envelope", as recited in claim 55. Therefore, the Nodwell reference fails to satisfy the above-noted requirements for a finding of anticipation of claim 55. Applicants therefore respectfully request that this ground of rejection be withdrawn.

Applicants further respectfully note in passing that an apparatus as defined by claim 55 provides numerous advantages over the Nodwell device. For example, column 4, lines 43-45 and Figure 2 of Nodwell appear to show the outer regions of the anode structure 24 as being made of the same material as the cone-shaped anode surface 36, namely, a conductive material such as copper. These conductive outer regions of the anode structure 24 would therefore be at the same electrical potential as the anode surface 36. Accordingly, it may be dangerous to place two or more arc lamps as disclosed in Nodwell in close proximity to each other, particularly in opposite directions (i.e. with the anode of one lamp adjacent the cathode of the next; Nodwell discloses at col. 4 lines 41-42 that the cathode structure 23 is also

conductive). In contrast, as disclosed in Applicants' specification, the use of electrically insulated flow generators as recited in claim 55 advantageously allows such close spacing and configuration in multi-lamp systems to be achieved, so that a plurality of apparatuses as defined by claim 55 may be closely spaced parallel to each other and in opposite directions, thereby minimizing the resulting magnetic field. The Nodwell device fails to provide any such advantages.

Claims 56-63, 66, 69 and 75 are directly or indirectly dependent upon claim 55. Applicants therefore respectfully submit that these claims are allowable due to their dependencies, as well as the additional subject-matter that each of these claims recites.

Independent claims 115 and 116 recite:

115. An apparatus for producing electromagnetic radiation, the apparatus comprising:

    a) electrically insulated means for generating a flow of liquid along an inside surface of an envelope; and

    b) means for generating an electrical arc within the envelope to produce the electromagnetic radiation.

116. A method of producing electromagnetic radiation, the method comprising:

    a) generating a flow of liquid along an inside surface of an envelope, using an electrically insulated flow generator; and

    b) generating an electrical arc between first and second electrodes to produce said irradiance flash.

Thus, claims 115 and 116 recite limitations similar to those discussed above in connection with claim 55. Applicants therefore respectfully submit that claims 115 and 116 are allowable for reasons including those presented above in connection with claim 55.

35 U.S.C. § 103(a)

The Examiner has rejected claims 64, 65, 71 and 72 under 35 U.S.C. § 103(a) as being unpatentable over Nodwell in combination with U.S. Patent No. 6,621,199 to Parfeniuk et al. ("Parfeniuk"). The Examiner has further rejected claims 67 and 68 as being unpatentable over Nodwell in view of Parfeniuk and in further view of U.S. Patent No. 5,753,106 to Schenck. The Examiner has further rejected claim 73 as being unpatentable over Nodwell in view of Parfeniuk and in further view of U.S. Patent No. 5,137,659 to Ashley. The Examiner has further rejected claim 74 as being unpatentable over Nodwell in view of Parfeniuk and in further view of U.S. Patent No. 6,465,799 to Kimble.

Applicants respectfully note in passing that Parfeniuk also shares overlapping inventorship with, and is commonly owned with, the present application.

Claims 64, 65, 67, 68 and 71-74 are directly or indirectly dependent upon claim 55, which has been shown to be allowable under the previous heading. Applicants therefore respectfully submit that claims 64, 65, 67, 68 and 71-74 are allowable due to their dependencies, as well as the additional subject-matter that each of these claims recites.

Claim 70

The Examiner has not rejected or otherwise commented upon claim 70 in the text of the Office Action, but has included claim 70 among the list of rejected claims in the Office Action Summary.

Claim 70 is indirectly dependent upon claim 55, which has been shown to be allowable earlier herein, in connection with 35 U.S.C. § 102. Applicants therefore respectfully submit that claim 70 is allowable due to its dependency, as well as the additional subject-matter that it recites.

Election / Restrictions: Request for Rejoinder of claims 76-114 and 117-131

As a result of the previous Election / Restriction requirement and applicants' response thereto, claims 1-54, 76-114 and 117-144 stood withdrawn from consideration. The Examiner has made the requirement final.

Accordingly, by the present amendment, claims 1-54 and 132-144 have been cancelled, without prejudice to the applicants' right to pursue these claims via one or more divisional applications stemming from the present application.

Rejoinder of claims 76-114 and 117-131 is respectfully requested pursuant to 37 C.F.R. § 1.141.

In this regard, claims 76-114 and 117-119 are directly or indirectly dependent upon independent claim 55, while claims 120-131 are directly or indirectly dependent upon independent claim 116.

Independent claims 55 and 116 are both generic to all relevant alleged species identified by the Examiner to which their dependent claims 56-114 and 117-131 pertain, and therefore, claims 55 and 116 are both linking claims as discussed in M.P.E.P. § 809.03. As independent claims 55 and 116 have been shown to be allowable, applicants respectfully request that their dependent claims 76-114 and 117-131 be rejoined in this application and allowed, pursuant to 37 C.F.R. § 1.141.

Conclusion

In view of the foregoing, applicants respectfully submit that the present application is in condition for allowance, and respectfully request that a Notice of Allowance be issued.

Should there be any questions concerning this application, the Examiner is respectfully invited to contact the undersigned agent at the telephone number appearing below. Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

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